Climate Change Work Group Meeting #1

Time: ***August 12, 12:00-4:00pm***
Location: ***MWH***
3321 Power Inn Road, Suite 300
Sacramento, CA 95814

MEETING ATTENDANCE:

Present:

Name	Organization
Mike Anderson	*Department of Water Resources (DWR)*
Kwabena Asante	*GEI Consultants*
Stacy Ceppello	*DWR*
Charlotte Chorneau	*Center for Collaborative Policy (CCP)*
Mike Dettinger	*U.S. Geological Survey (USGS)*
Abdul Khan	*DWR*
Erin Mullin	*DWR*
Marty Ralph	*National Oceanic and Atmospheric Administration (NOAA)*
David Raff (phone)	*US Bureau of Reclamation (USBR)*
Andrew Schwarz	*DWR*
Susan Sherry	*CCP*
Yung-Hsin Sun	*MWH*
Robin Webb	*NOAA*
Matt Young	*MWH*

GROUP PURPOSE AND RECAP: (meeting highlights for use by Work Group partners in their communications based on Work Group Charter)

The Climate Change Thresholds Approach Work Group (CCTAWG) met for its first of two meetings to further develop the concept of threshold analysis approach recommended by the Climate Change Scope Definition Work Group (CCSDWG) in Phase 1 of the Central Valley Flood Protection Plan (CVFPP).

The CCTAWG was chartered as a technically-focused work group assisting with development of an evaluation framework to incorporate climate change planning considerations into the CVFPP. The work group will provide external expertise on this emerging scientific subject. The group will focus on application of the science in the most uncertain element in the existing climate change scenario analysis, extreme atmospheric and hydrologic events.

SUMMARY:

****WORK GROUP CHARTER AND ALL PRESENTATIONS AND MATERIALS AVAILABLE ONLINE AT www.water.ca.gov/cvfmp****

Welcome and Business Items

Erin Mullin, DWR, Central Valley Flood Protection Office (CVFPO) Representative, opened the first meeting by welcoming back participants and thanking them for their continued participation in Phase 2. She mentioned her excitement to work with this team of experts. She explained that this group has a very directive and specific task, while other work groups are more publically focused. She also welcomed Stacy Cepello, DWR, as a new member of the work group representing the environmental interests of the CVFPO as the project team hopes to start integrating these efforts with CEQA, and other state requirements for environmental protection.

Yung-Hsin Sun, MWH, mentioned the group has been charted differently this time around. Phase 1 was the scoping exercise with a boarder focus of the adaptation strategy, while Phase 2 is focused on the threshold (an idea which is the produce of the Phase 1 work group's input). Susan Sherry, Facilitator with the Center for Collaborative Policy (CCP), reviewed the agenda and the logistics of the afternoon.

Discussion of the Threshold Analysis Draft Document

Mr. Sun reviewed the Threshold Analysis Work Plan Outline, explaining that the items in bold on the outline are priority discussion topics for this first meeting. Mr. Sun reiterated that the Threshold Analysis Approach was a key recommendation from Phase 1 by this work group which is mentioned on page 1-2 of the draft Technical Memorandum (TM). Matt Young, MWH, explained the draft TM was compiled to help start the conversation by the work group. Mike Anderson, DWR, clarified that he intends to add more detail to the draft, and hopes it has enough content for the group to react to.

Mr. Young walked the group through the outline, mentioning that Section 2: Threshold Analysis Approach is where the group will spend the majority of their time discussing today (on the definitions and evaluation of thresholds). Mr. Young explained that Section 3 is the implementation plan which will include other studies to consider. Ms. Mullin noted that within the document there are boxes, also an indication of priority areas to obtain feedback on.

The work group discussion followed the document outline, as follows:

Section 1.0: Introduction (Contains boilerplate language).

Section 1.1: Climate Change and CVFPP

- One participant suggested directly referencing the Climate Change Scope Definition report from Phase 1 as much of the language came from the that document.
- Mr. Cepello proposed referencing what was happening to other recommendations from Phase 1 within the CVFPP process to provide more context.

Section 1.2: CVFPP Unique Methodology Requirements

- A member mentioned that DWR has a report coming out which has cataloged all the studies DWR has been involved with regarding climate change. The report summarizes how each study has incorporated climate change. Of 14 studies, none are for flood protection, so DWR has no precedent for this approach.
- Ms. Mullin requested for a brief description of the report to reference in the Threshold Analysis document.

Section 1.3: Purpose

- A member asked if the objective of this work group is to define the methodology. He asked how the Department envisions implementing this methodology. Mr. Anderson clarified that yes, the work group will work on the methodology and the Department will include it in the 2012 plan the framework for actions to take in 2017. Mr. Sun added that the CVFPP is updated every five years which allows for the ability to plug in new research. Ms. Mullin mentioned that CEQA requires climate change to be considered for doing environmental documents, and the way this is handled within the CVFPP process will inform other State efforts.

Section 2.0: Threshold Analysis Approach

Section 2.1 Definition of Threshold Analysis and 2.2: Identification of System Components

- Participants expressed concern that the concept is not defined. He pointed out in the Climate Change Scope Definition report from Phase 1 (on page 28) there is reference to the threshold concept, however, the TM does not clearly define this concept. Participants agreed that the Scope Definition report laid out steps and though it was high-level it would be good to include those in the TM. It was suggested that a specific example should be included in a call out box in this section.
- A participant offered to run these definitions by NOAA staff to get additional input.
- One member stated that the steps outlined on Page 2-2 are too high level. Mr. Anderson clarified that the idea is to tie into existing models such as forecasting stage models and reservoir models (such as those developed work group members or their agencies), to develop methodologies for estimating climate change impacts and how to plan for a more resilient system. The participant suggested using historical experience and models in light of current and expected forecast for now to make this section less vague.
- A participant commented that defining the threshold is going to be the most difficult aspect of this document.
- One member suggested adding something along the lines of: “performance criteria of components and function for the system sufficient to withstand historical and range of conditions” which is consistent with a recently published article “Incorporating Climate Change in Water Planning” by the American Water Works Association.
- A participant stated that the part of the definition is to try and “avoid unacceptable consequences due to exceeding the threshold.” This is not a threshold analysis approach; it is identifying and accessing the likelihood or probability of occurrence.

- One member offered a different suggestion that the group needs to think about this in the consequence of climate change and the new thresholds as “unacceptable frequency” rather than “unacceptable consequences.” He urged the group to be clear about what thresholds they are considering.
- A participant suggested thresholds of action and looking at specific points within the system that can fail.
- A participant suggested using annual cost or demand as a measurement and that thresholds should be reassessed.
- One member stressed the importance of outlining the triggers within the legislation and in emergency response.

Section 2.3: Identification of Key System Thresholds for CVFMP

Mr. Young explained that the Worksheet 1 contains Section 2.3 metrics for evaluating thresholds (community metrics).

Worksheet 1: Community Metrics
Members of the work group suggested community metrics which should be included:

- Economies damages
- Ecosystem
- Continuing maintenance costs
- Insurance premiums (change in insurance requirements)
- Permanent losses (how much area do you gradually loose/concede)
- Need for resizing of system components
- Resilience (capacity that community to recover after that event – frequency)
- How the community recovers (how they get back and as the frequency increases they find it more and more difficult to recover)
- Recreational loss
- Additional cost to community due to flooding (additional risk due to climate change and if you have decreased level of protection due to climate change that would increase the cost to the community and go to a high level of protection)
- Frequency and depth (if not a level of protection)
- Loss of life
- Environmental resource loss
- Resource investment requirements
- Income loss
- Evacuation extent
- Physical location (consider characteristics such as a contributing water shed above the area)
- Location’s ability to capture flood overflow or flood protection preventing it from spilling it else where
- Built infrastructure

Discussion:

- A participant mentioned how important defining things such as frequency will be. He also pointed out the need to separate risk and impacts - the risk should be related to a level of protection method.
- Mr. Young pointed out that many of the suggestions are not measureable.
- A participant conveyed that the risk type metrics will be a part of the methodology but what the community will care about is the impact. Mr. Sun suggested the need for parsing out direct impact vs. subsequent impact.
- Mr. Sun clarified that the CVFPP is a strategic plan.
- A participant asserted that communities will need to pay more money now to avoid a cost later and that is an impact that a community is going to have to weight these various impacts.
- Ms. Mullin pointed out there is legislation requiring that communities have to comply with the state flood plan to be able to expand development.
- Ms. Mullin stated that she does not agree with included insurance requirements as a metric. She saw this as allowing someone else to decide on the risk.
    - A participant however, was comfortable with the idea of insurance because money is put in upfront to reduce the adverse effects later.
- One participant explained that risk is going to go up as population grows, and events could be more extreme due to climate change.
- A participant asked how resiliency would be measured, since most things will not be damaged in one year by one event. Instead damage occurs over time, and at a certain point for that community it will not make sense to repair or rebuild.

Worksheet 2: Hydrologic Metrics

[*From the Worksheet:* The following example metrics describe attributes of a flood moving through the system. These metrics are indicative of the strain put on the flood management system by flood events.

- **Peak flow** – Three-day peak flow is a widely used metric for measuring flood magnitude.

- **Volume of flow** – The volume of a flow has significant impacts on the flood system, especially in increasing pressure on flood management reservoirs.

- **Duration of flow** – The flow duration determines the amount of time the flood control system is engaged during a flood event. The system is already overtaxed, and increased duration of high flows will create additional strain.

- **Timing of flow (seasonality)** – Flood risk in California occurs at specific periods of a year, so a metric measuring the timing of flows is necessary. Several methods are currently in use to measure the seasonality of flow including spring pulse onset, center of mass, and monthly seasonal fractional flows, among others.]

Mr. Anderson asked if the metrics listed on the worksheet are appropriate

- Participants affirmed that these metrics are appropriate.
- One participant suggesting defining time such as “1, 3, 5 and 7 days” to volume flows.
- Another participant asked what is meant by “a 3 day peak flow means.” Mr. Anderson explained that it is an average for the 3 largest consecutive days.

- A participant suggested adding instantaneous in addition to peak.
- One member pointed out that for natural flood plains a longer duration flood is beneficial.
- The sequence of events should be embedded or considered. A participant agreed some assessment of the atmospheric waste (continuing pummeling of storms).
- A participant suggested separating hydrologic metrics and flat metrics.
- One participant suggested adding time to peak flow as a metric.
- A participant pointed out this is looking like a complete hydrograph. Mr. Sun responded that they are separating the hydrograph because different aspects will have different effects and different metrics.
- Mr. Sun pointed out that "stage" is not an independent variable and that is an outcome.
- A participant suggested considering the melting ratio and separating rain from snow. He explained this is important for timing changes. Mr. Dettinger suggested broadening the precipitation metric to capture snow on the ground and moisture.
- Another participant suggested considering maximum flow dates for the timing considerations.
- A participant suggested adding "peakiness." Meaning volume of main flow vs. peak flow. He also added erosion flows.
- One participant suggested year to year frequency – inter annual persistence - atmospheric.
- Mr. Anderson suggested bundling the flow components.
- A participant suggested considering probability for being in these quadrants:

Warm dry	Warm wet
Cold dry	Cold wet

- Mr. Anderson asked what are existing metrics:
    - Atmospheric River Index (ARI)
    - El Niño/Southern Oscillation (ENSO) – NOAA Research
    - Orographic ratio
- Mr. Sun mentioned the importance of accuracy. Long term planning by forecasting is trying to capture the trends in order to anticipate and do responsible planning.
- A participant suggested defining the event by the amplitude and how often an event of similar amplitudes occurs across the US. He explained that there could be categories or levels such as the highest would be greater than 500 ml in 3 days. California is a hot spot for events of the highest category. Another participant agreed and added that the likelihood of these events are should be considered.
- A participant added geographic breadth or reach of the storm and direction of impact on the water shed.

The work group discussed the use of the metrics. Mr. Anderson and others explained that not all metrics will be in the final report, but that they are necessary building blocks for threshold analysis. Mr. Sun added that with a shared basis of understanding it will be easier to convey what the thresholds mean and what people will want out of them.

Closing Remarks:

Mr. Sun and Mr. Anderson explained that the next steps are to update the draft climate change threshold analysis work plan TM based on the discussion of the group. Mr. Anderson will follow up on some specifics offline with work group members with certain expertise. The next meeting of the climate change work group will be Monday, August 23rd from 8:00am – 12:00pm.

Adjourn